CLAIMS

1. A method of manufacturing a workpiece, comprising the following steps:

constructing a laminated structure comprising two pieces of ceramic material with a metal electrode therebetween;

cutting the laminated structure along parallel planes perpendicular to the electrode to form a multiplicity of laminated pieces with respective electrodes;

bonding the laminated pieces in sequence to form a bonded stack in which the electrodes are spaced apart and substantially mutually parallel; and

placing a layer of dielectric material on a surface on one side of the bonded stack where the edges of the electrodes are exposed.

2. The method as recited in claim 1, wherein the constructing step comprises metallizing a surface of each ceramic piece.

3. The method as recited in claim 2, wherein said constructing step further comprises the following steps:

placing the ceramic pieces on opposite sides of a metal foil with metallized layers in contact with the metal foil; and

laminating the metallized ceramic pieces and metal together to form the laminated structure.

4. The method as recited in claim 1, further comprising the step of coating a surface of the layer of dielectric material with patterned metal.

5. The method as recited in claim 1, further comprising the steps of placing a layer of spacer material on a surface on the other side of the

bonded stack and then grinding the layer of spacer material to a desired thickness.

6. The method as recited in claim 5, further comprising the following steps:

cutting the bonded stack along respective planes where the laminated pieces were bonded, thereby forming a multiplicity of modified laminated pieces, each modified laminated piece comprising a layer of dielectric material on one side and a layer of spacer material on another side; and

placing the modified laminated pieces in an array with the layer of spacer material of each modified laminated piece confronting the layer of dielectric material of an adjacent modified laminated piece and with the electrodes substantially co-planar.

7. The method as recited in claim 6, further comprising the step of metallizing surfaces of the array of modified laminated pieces that are substantially parallel to the co-planar electrodes .

8. The method as recited in claim 7, wherein each of the modified laminated pieces is a bar disposed parallel to a longitudinal axis, further comprising the step of cutting the portions of the array of modified laminated pieces that are disposed on one side of the plane defined by the co-planar electrodes , each cut being in a respective plane substantially perpendicular to the longitudinal axis, the cutting step being performed before or after the metallizing step.

9. The method as recited in claim 8, further comprising the steps of setting the cut portions of the array of modified laminated pieces over a patterned array of electrical signal connectors and bonding the former to the latter with respective sections of a confronting metallized surface of the array of

modified laminated pieces in electrical contact with the electrical signal connectors.

10. The method as recited in claim 9, further comprising the step of cutting the portions of the modified laminated pieces that are disposed on the other side of the plane defined by the co-planar sections of the center metal layer, each cut being substantially co-planer with a respective cut on the one side.

11. The method as recited in claim 10, further comprising the step of embedding the patterned array of electrical signal connectors in a body of acoustically attenuative material with respective ends of the electrical signal connectors exposed at a surface of the body, wherein the step of bonding the array of modified laminated pieces to the patterned array of electrical signal connectors comprises bonding the array of modified laminated pieces to the body.

12. The method as recited in claim 11, further comprising the step of cutting the array along the layers of spacer material to a depth in the body of acoustically attenuative material.

13. The method as recited in claim 11, further comprising the step of causing the spacer material to liquefy or dissolve.

14. A method of manufacturing a workpiece, comprising the following steps:

constructing a laminated structure comprising two plates of ceramic material with a metal electrode therebetween;

cutting the laminated structure along parallel planes perpendicular to the metal electrode to form a multiplicity of laminated bars, each laminated bar having four sides forming a generally rectangular profile and comprising two ceramic pieces separated by a respective metal electrode; and

for each of the laminated bars, placing a layer of dielectric material on the surface of a first side where the edges of the metal electrodes are exposed, the dielectric layer covering the exposed edge, and applying metal on the surfaces of second and third sides contiguous with the first side and on a multiplicity of sections of the dielectric layer, each metallized section of the dielectric layer being electrically connected to the metallized surfaces of the second and third sides.

15. The method as recited in claim 14, wherein the constructing step comprises metallizing a surface of each ceramic piece.

16. The method as recited in claim 15, further comprising the following steps:;

placing the ceramic pieces on opposite sides of a metal foil with metallized layers in contact with the metal foil; and

laminating the metallized ceramic pieces and metal together to form the laminated structure.

17. The method as recited in claim 14, further comprising the steps of placing a layer of spacer material on the surface of a fourth side opposite to the first side and grinding the layer of spacer material on each laminated bar to a desired thickness.

18. The method as recited in claim 17, further comprising the step of bonding the laminated bars together in a side-by-side array with the layer of spacer material of each laminated bar confronting the dielectric layer of an adjacent laminated bar and with the metal electrodes of the laminated bars substantially co-planar, the bonding step being performed before the second and third sides are metallized.

19. The method as recited in claim 18, further comprising the step of cutting the portions of the laminated bars in the side-by-side array that are disposed on one side of the plane defined by the metal electrodes of the

laminated bars, each cut being in a respective plane substantially perpendicular to a longitudinal axis of the bars.

20. The method as recited in claim 19, further comprising the steps of setting the cut face of the side-by-side array over a patterned array of electrical signal connectors and bonding the former to the latter with respective confronting metallized surfaces of the side-by-side array in electrical contact with the electrical signal connectors.

21. The method as recited in claim 20, further comprising the step of cutting the portions of the laminated bars that are disposed on the other side of the plane defined by the electrodes of the laminated bars, each cut being substantially co-planer with a respective cut on the one side.

22. The method as recited in claim 21, further comprising the step of embedding the patterned array of electrical signal connectors in a body of acoustically attenuative material with respective ends of the electrical signal connectors exposed at a surface of the body, wherein the step of bonding the side-by-side array of laminated bars to the patterned array of electrical signal connectors comprises bonding the side-by-side array to the body.

23. The method as recited in claim 22, further comprising the step of cutting the side-by-side array along the layers of spacer material to a depth in the body of acoustically attenuative material.

24. The method as recited in claim 22, further comprising the step of causing the spacer material to liquefy or dissolve.

25. An ultrasound transducer array precursor comprising a multiplicity of substantially identical rectilinear bars bonded side by side to form a row of attached bars, wherein each bar comprises two ceramic portions of substantially equal thickness separated by a metal electrode, a layer of dielectric material on the surface of a first side where the edge of the electrode is exposed, the dielectric layer covering the exposed edge, respective layers of

metal on the surfaces of second and third sides contiguous with the first side and on a multiplicity of sections of the dielectric layer, each metallized section of the dielectric layer being electrically connected to the metallized surfaces of the second and third sides, and a layer of spacer material on the surface of a fourth side opposite to the first side, the layer of spacer material of each bar confronting the dielectric layer of an adjacent, bar and the electrodes of all bars being substantially co-planar.

26. An ultrasound transducer array comprising a first row of laminated transducer elements that are acoustically isolated from each other, each of said laminated transducer elements comprising:

top and bottom layers of ceramic material of substantially equal thickness separated by a metal electrode that extends along a horizontal plane;

a layer of dielectric material disposed on a side where the edge of the center metal layer is exposed, said dielectric layer covering the exposed edge on that side and extending along a vertical plane;

a first layer of metal disposed on a horizontal front surface of said top layer of ceramic material;

a second layer of metal disposed on a horizontal rear surface of said bottom layer of ceramic material; and

a third layer of metal disposed on said dielectric layer and patterned to form an electrical connector that is in electrical contact with said first and second metal layers, thereby forming a wrap-around electrode.

27. The array as recited in claim 26, further comprising a second row of laminated transducer elements that are acoustically isolated from each other and from said laminated transducer elements of said first row, said laminated transducer elements of said second row having substantially the same structure as that of said laminated transducer elements of said first row and being respectively aligned to form a multiplicity of columns, the laminated

transducers of each column having their metal electrodes electrically connected, while their wrap-around electrodes are electrically isolated from each other.

28. The array as recited in claim 27, further comprising an acoustic backing layer made of acoustically attenuative material, said first and second rows of laminated transducer elements being acoustically coupled to said acoustic backing layer, and a patterned array of electrical signal connectors embedded in said acoustic backing layer with respective ends of the electrical signal connectors exposed at a surface that confronts said first and second rows of laminated transducer elements, said third metal layers being respectively in electrical contact with said electrical signal connectors.